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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,314	09/27/2006	Toshio Fuchigami	063115	2105
38834 7590 04/16/2008 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036				
EXAMINER				
ALLEN, CAMERON J				
ART UNIT		PAPER NUMBER		
1797				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/594,314

**Applicant(s)**

FUCHIGAMI ET AL.

**Examiner**

CAMERON J. ALLEN

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 September 2006.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-8 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 27 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-850)  
Paper No(s)/Mail Date See Continuation Sheet  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :2/02/2007, 11/20/2006, 9/27/2006.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, and 6- 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Edited by Kabushiki Kaisha NTS The Edition Planning Department, "Green chemistry Series 2 Ion-sei Ekitai no Kino Sosei to Oyo, Kabushiki Kaisha NTS, 01 February 2004 pages 60-62)

Regarding claim 1, Kabushiki Kaisha NTS discloses a process for photolyzing organic matter, characterized by photolytically degrading organic matter within a reaction system (Abstract) that includes a photo catalyst (Column 3 line 14-16) and a hydrophobic ionic liquid. (pages 60-62)

Regarding claim 2, Kabushiki Kaisha NTS discloses the process for photolyzing organic matter of claim 1 but does not disclose wherein the hydrophobic ionic liquid is a quaternary ammonium-type ionic liquid. (31-35, and 111-115)

Regarding claim 3, Kabushiki Kaisha NTS discloses the process for photolyzing organic matter of claim 2 which is characterized in that the quaternary ammonium-type

ionic liquid has general formula (i) below [Chemical Formula 1]

wherein R1 to R4 are each independently an alkyl group of 1 to 5 carbons or an alkoxyalkyl group of the formula R'-O-(CH2)n- (R' being methyl or ethyl, and the letter n being an integer from 1 to 4) and any two of R1, R2, R3 and R4 may together form a ring, with the proviso that at least one of R1 to R4 is the alkoxyalkyl group of the above formula; and Y is a monovalent anion. (31-35, and 111-115)

Regarding claim 4, Kabushiki Kaisha NTS discloses the process for photolyzing organic matter of claim 3 but does not disclose that the quaternary ammonium-type ionic liquid has formula (2) below [Chemical Formula 2] wherein "Me" stands for methyl and "Et" stands for ethyl. (31-35, and 111-115)

Regarding claim 6, Kabushiki Kaisha NTS discloses a wastewater treatment process which is characterized by using the process for photolyzing organic matter of any one of claims 1 to 4. (pages 60-62)

Regarding claim 7, Kabushiki Kaisha NTS discloses a wastewater treatment process of claim 6 which is characterized by comprising the steps of, in order: extracting organic matter by mixing together a hydrophobic ionic liquid and organic matter-containing wastewater so as to move the organic matter from the wastewater into the hydrophobic ionic liquid; separating the organic matter-containing hydrophobic ionic liquid and the wastewater; and adding a photocatalyst to the organic matter-containing hydrophobic ionic liquid and carrying out light exposure so as to photolytically degrade the organic matter. (pages 60-62)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over over Edited by Kabushiki Kaisha NTS The Edition Planning Department, "Green chemistry Series 2 Ion-sei Ekitai no Kino Sosei to Oyo, Kabushiki Kaisha NTS, 01 February 2004.

Regarding claim 5, Kabushiki Kaisha NTS teaches the process for photolyzing organic matter of any one of claims 1 to 4 but does not teach that the photo catalyst is titanium dioxide. The examiner takes official notice that titanium dioxide is a well known photo catalyst used for photolyzing organic matter. It would have been obvious to one of ordinary skill in the art at the time of the invention to use titanium dioxide as a photo catalyst, since it is known to be effective in photolyzing organic compounds and provides the expected result of a catalytic effect.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Edited by Kabushiki Kaisha NTS The Edition Planning Department, "Green chemistry Series 2 Ion-sei Ekitai no Kino Sosei to Oyo, Kabushiki Kaisha NTS, 01 February 2004 pages 60-62) in view of Aoki Nobutada JP 09-220550.

Regarding Claim 8, Kabushiki Kaisha NTS discloses the wastewater treatment process of claim 6 which is characterized by comprising the steps of, in order: subjecting a mixture of a hydrophobic ionic liquid, a photocatalyst and organic matter-containing wastewater to light exposure under agitation so as to photolytically degrade the organic matter (Pg. 60-62), but does not teach separating the wastewater and the hydrophobic ionic liquid. The Tokyo Electric Power Co. reference discloses separating the wastewater and the treatment agents remaining in the reaction in order to recycle them.

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(Abstract) It would have been obvious to one of ordinary skill in the art at the time of the invention to separate the treatment agents for the added benefit of being able to recycle the materials.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Van Kruchten US 6,124,508.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAMERON J. ALLEN whose telephone number is (571)270-3164. The examiner can normally be reached on M-Th 9-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CJA

/Walter D. Griffin/  
Supervisory Patent Examiner, Art Unit 1797